

MODULE 5 SECTION 3**PRACTICE AND APPLICATIONS****For use with Exploration 1****Write each product as a single power.**

1. $10^5 \cdot 10^3$

2. $10^2 \cdot 10^8$

3. $3^2 \cdot 3^5$

4. $5^4 \cdot 5^9$

5. $2^4 \cdot 2$

6. $6^3 \cdot 6^5 \cdot 6$

7. $x \cdot x^5$

8. $y^3 \cdot y^4$

9. $n^5 \cdot n^5$

10. $y^{12} \cdot y^{20}$

11. $w^{80} \cdot w^{12}$

12. $r^8 \cdot r \cdot r^5$

13. The "stopping" distance of a car is the distance it takes to stop after braking. The "stopping distance" is related to the speed of the car by the equation $d = k \cdot s^2$, where d is the distance in feet, s is the speed in miles per hour, and k is a number that depends on the car and the road conditions.

- Since the exponent of the speed of the car is 2, the stopping distance depends on the square of the speed. Is this true?
- Suppose it is known that $k = 1.5$. What is the stopping distance of a car traveling at 30 mi/h? at 60 mi/h? How are these two answers related?

Write each quotient as a single power.

14. $\frac{10^8}{10^6}$

15. $\frac{10^{12}}{10^7}$

16. $\frac{5^5}{5}$

17. $\frac{8^7}{8^3}$

18. $\frac{6^{16}}{6^{12}}$

19. $\frac{4^5 \cdot 4^4}{4^2}$

20. $\frac{y^8}{y^5}$

21. $\frac{c^8}{c^7}$

22. $\frac{d^8}{d^4}$

23. $\frac{k^9}{k}$

24. $\frac{v^{99}}{v^{60}}$

25. $\frac{a^{42}}{a^{12} \cdot a^8}$

26. The annual number of cruise ship passengers p (in millions) after t years starting from 1960 can be modeled by the equation $p = 0.229(1.09)^t$.

- Find the ratio of the number of passengers in 1990 to the number of passengers in 1970. Hint: $t = 30$ for 1990, and $t = 10$ for 1970.
- The number of passengers in 1990 is how many times as much as the number of passengers in 1970?
- According to the equation, how many cruise ship passengers were there in 1970?

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